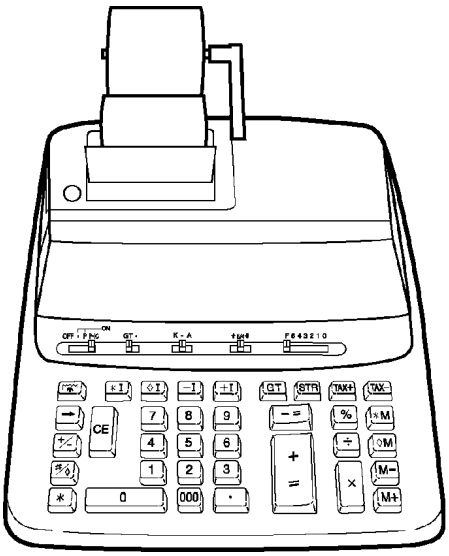
SHARP SERVICE MANUAL

CODE : 00ZCS4194H//E

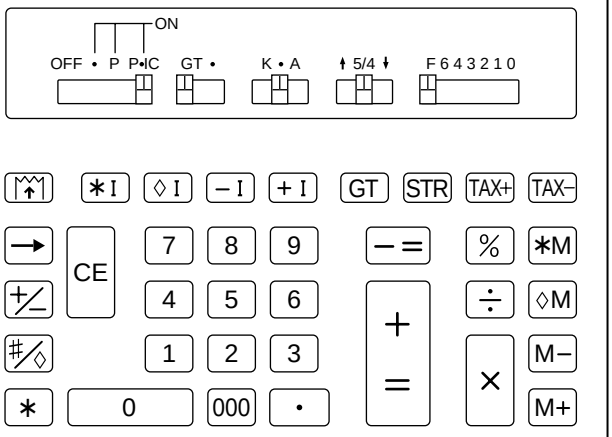


MODEL CS-4194H

(for except USA)

STANDARD FUNCTION	14 digits 2M		
DISPLAY SECTION	12,345,678,90 1,234. MI •E		
	ELEMENT: D G	PARTS NAME:	15-LT-07GN
	NUMERAL: 14 digits	SYMBOL:	1 digit (s)
	14.0 / 4.38 (mm)	MI / •E	
LSI	Name : TMP47C670N-3VA4		
	Type : SDIP		
	Pin : 64 Pins		
POWER SUPPLY	AC: O	DC: ×	
• BATTERY TYPE	AC only		
• MEMORY PROTECTION BATTERY (ACO only)	CR2032 x 1pc Approx. 2 years. (tested and confirmed at 25℃ (77℉); may change due to usage environment)		

KEY LAYOUT



KEY SYSTEM: Plastic key + Rubber spring

AC ADAPTOR	
RECHARGEABLE BATTERY	
POWER CONSUMPTION	220-230V: 53mA Multi: 11.8W
AUTO POWER OFF TIME	
MEMORY PROTECT	Yes※1 (TAX only)
DIMENSIONS (mm)	250 (W) 345 (D) 78 (H)
CALCULATIONS	

Four arithmetic calculations, constant multiplication and division, power calculation, add-on/discount calculation, repeat addition and subtraction, reciprocal calculation, grand total calculation, item count calculation, memory calculation, etc.

NOTE)※1: Enable only when power is supplied from the power cord or the backup battery.

PRINTER SECTION

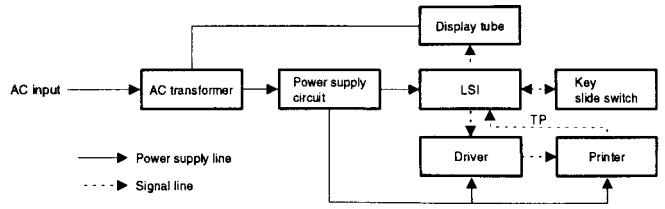
MODEL NAME	M-90S (14)
PRINTING SYSTEM	Print wheel selective system
PRINTING CAPACITY	18 digits
CHARACTER DIMENSION	1.6 (W) 2.8 (H) mm
INPUT BUFFER	12 stages
PRINTING SPEED	Approx. 4.3 lines/sec
PAPER FEED SPEED	Approx. 4.3 lines/sec
PAPER RELEASE MECHANISM	Yes (Forward only)
INK RIBBON	2-color (Black/Red) : URBNT1007CCZZ
INK ROLLER	
INK LIFE	Approx. 30,000 lines
PAPER	Plain paper
PAPER SIZE (Roll paper)	58^{+0}_{-1}mm (W), 80 mm in diameter DPAPR1004CSZZ ····· 5rolls/pack

Parts marked with "⚠" are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

This document has been published to be used for after sales service only.
The contents are subject to change without notice.

1. Block diagram



2. Power voltage

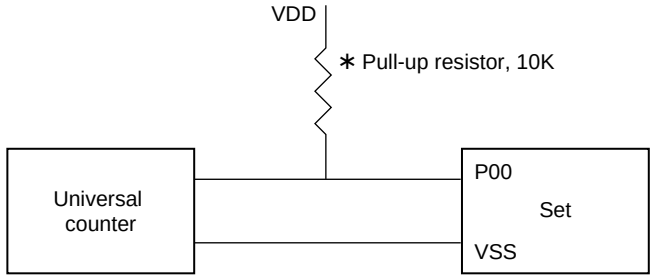
Measurement point	Power voltage	Remark
F1 - F2	4.5 V_{AC} ~ 5.1 V_{AC}	∗14-digit machine
VSS - VDD	4.5 V_{DC} ~ 5.5 V_{DC}	

∗Measure with the rated AC input voltage.

3. Printer speed adjustment

Measuring procedure

1) Connect VSS and P00 signal of LSI to the universal counter as shown below.

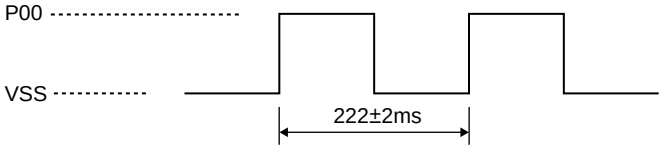


∗ Pull-up P00 signal to VDD.

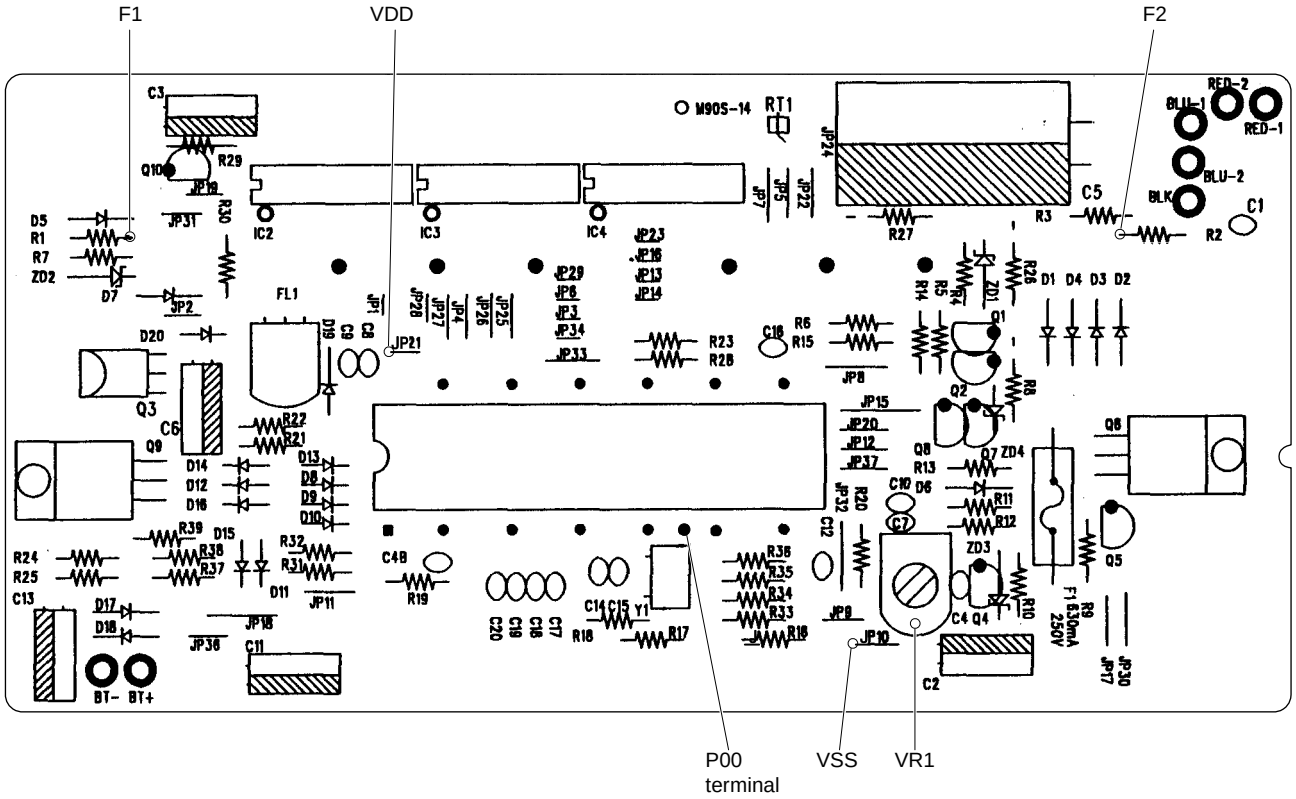
2) Press PF key, and measure the rising interval of P00 signal.

3) Adjust the volume (VR1) to set the rising interval of P00 signal to the following range.

SPEC : 222±2ms



- **MEASURING PIN POSITION**



4. Ink ribbon replacement

1. Remove the paper roll from the calculator. (Tear the paper and remove it from the print mechanism by using [⇧].)
2. Set the power switch to OFF.
   Make sure that the print wheel has stopped.
3. Remove the printer cover by sliding it towards the back of the calculator. (Fig. 1)
4. Remove the used ribbon.
5. Install the new ribbon.
6. With the black side of the ribbon facing upwards, place one of the reels on the reel shaft on the right. (Fig. 2)
   Make sure that the reel is securely in place.
7. Thread the ribbon around the outside of the metal guides. (Fig. 3)
8. Take up any slack by manually turning one of the reels.
9. Replace the printer cover.
10. Replace the paper roll.

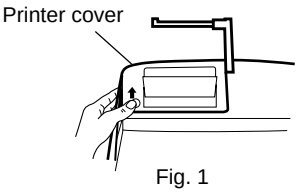


Fig. 1

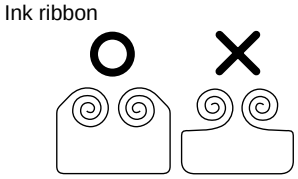


Fig. 2

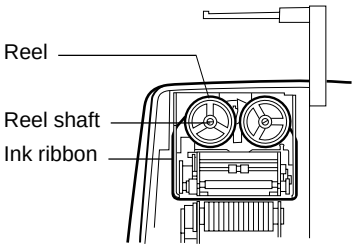


Fig. 3

5. Paper roll replacement

1. Lift the paper holder up. (Fig. 1)
2. Fold the leading edge of the paper roll 3 to 5 cm.
   (Do not fold it slantwise.) (Fig. 2)
3. Insert the paper roll from the left side of the paper holder and make sure the paper roll is set in the proper direction (with the paper feeding from the bottom). (Fig. 3)
4. Insert the leading edge of the paper into the opening directly behind the print mechanism. (Fig. 4)
5. Press the paper feed key and feed the paper under the edge of the paper cutter. (Fig. 5)

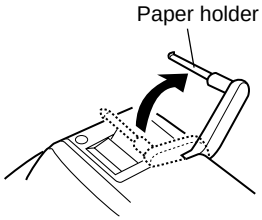


Fig. 1

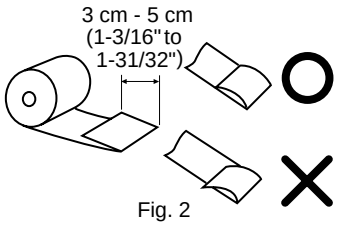


Fig. 2

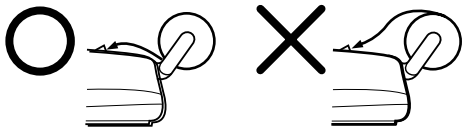


Fig. 3

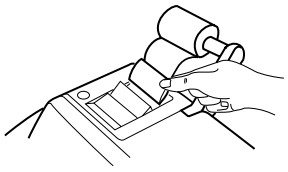


Fig. 4

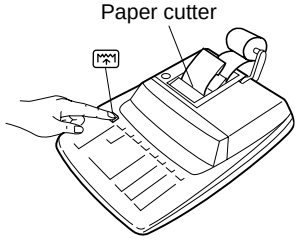


Fig. 5

DO NOT PULL THE PAPER BACKWARDS AS THIS MAY DAMAGE THE PRINTER MECHANISM.

6. Replacement of battery for memory protection (for CS-4194H (ACO))

Time for battery replacement

Replace with a new battery once 2 year.

Method of battery replacement

Use one lithium battery (CR2032).

Note: When replacing the battery, the set tax rate and the memory contents will be lost.
You may want to write down the tax rate and other important numbers on a sheet of paper.

1. Turn the power switch “OFF” and unplug the power supply plug from the outlet.
2. Remove the battery cover on the back of the unit. (Fig. 1)
3. Remove the exhausted battery and install one new lithium battery. Wipe the battery well with a dry cloth and place the plus “+” side upward. (Fig. 2)
4. Replace the battery cover by reversing the removal procedure.
5. Press the RESET switch on the back of the unit.

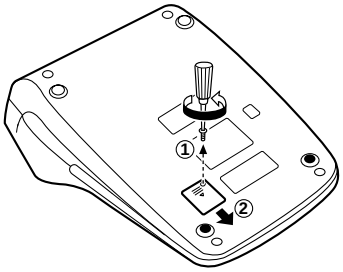


Fig. 1

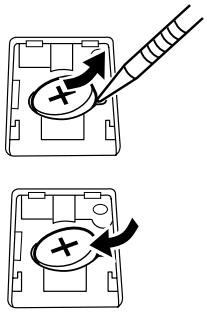


Fig. 2

After battery replacement

- Connect the power supply plug to an outlet and turn the power switch “ON”.
  Check that “0.” is displayed. If “0.” is not displayed, remove the battery, reinstall it, and check the display again.
- Reset the tax rate.
- On the battery replacement date label found on the back of the unit, write down the month and year when the battery is replaced, as a reference for the next battery replacement.

Precautions on battery use

- Do not leave an exhausted battery in the equipment.
- Do not expose the battery to water or flame, and do not take it apart.
- Store batteries out of the reach of small children.

Notes for handling Lithium batteries:

CAUTION
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacture’s instructions.

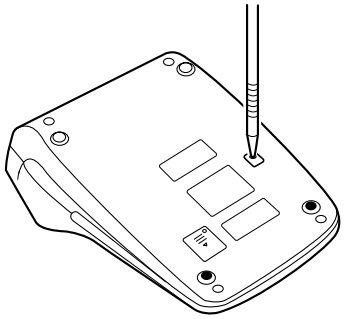
7. Resetting the unit (for CS-4194H (ACO))

Strong impacts, exposure to electrical fields, or other unusual conditions may render the unit inoperative, and pressing the keys will have no effect. If this occurs, you will have to press the RESET switch on the bottom of the unit. The RESET switch should be pressed only when:

- an abnormal event occurs and all keys are disabled.
- you install or replace the battery.

Note:

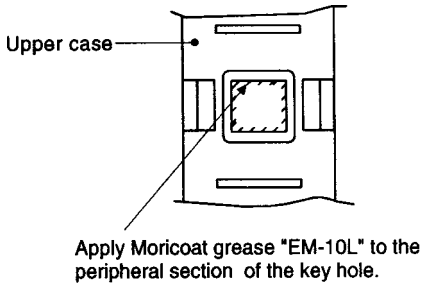
- Pressing the RESET switch will clear the stored tax rate and other data stored in the memory.
- Use only a ballpoint pen to press the RESET switch. Do not use anything breakable or anything with a sharp tip, such as a needle.
- After pressing the RESET switch, connect the power supply plug to an outlet. Turn the power switch “ON” and check that “0.” is displayed.



8. Servicing

(1) Apply grease to the upper case key hole.

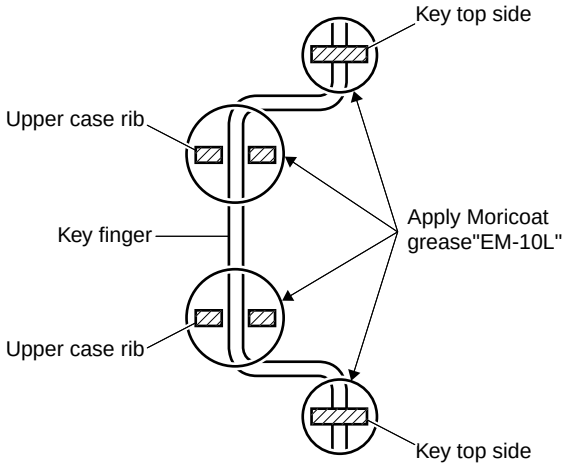
At first, spray the silicon spray to keyboard of upper case from back side (All keys).



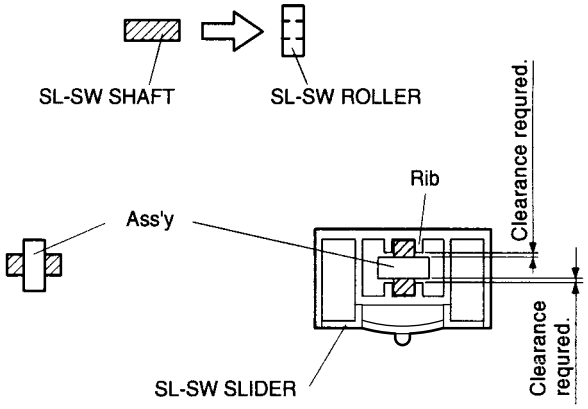
- Grease application to one position: – = (1 key)
- Grease application to two positions: 0, ×, CE (3 keys in total)
- Grease application to three positions: ± (1 key)

PART NAME	PART CODE
GREASE “EM-10L“	UKOG-1014CCZZ

(2) Apply grease to ± key and 0 key finger.



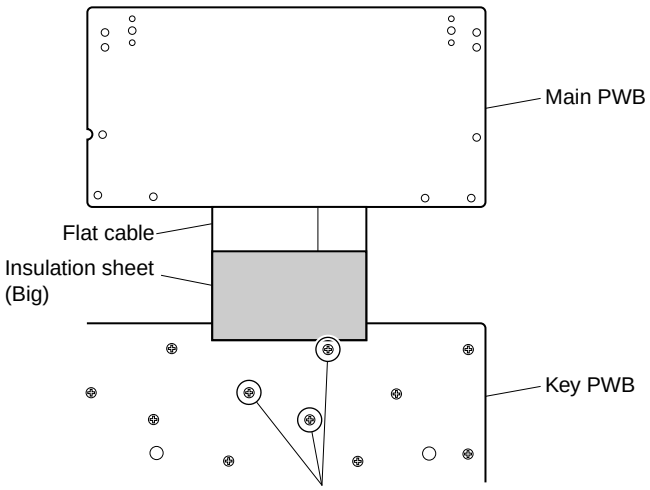
(3) Insertion of SL-SW roller into the shaft

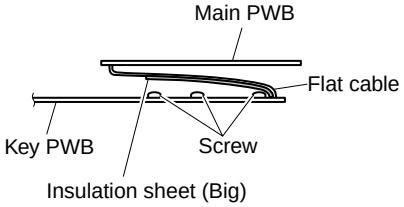


∗When inserting the ass’y into the SL-SW slider, allow a clearance between the rib and the SL-SW roller. (Refer to the figure above.)

(4) Insulation sheet (Big) attachment

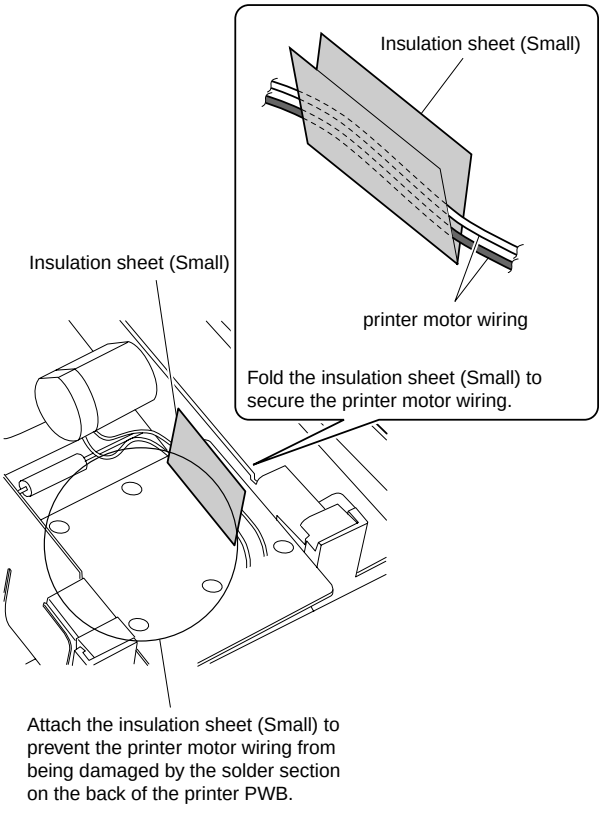
Attach the insulation sheet as shown in the figure below in order to protect the flat cable from the screw head on the key PWB.


Main PWB
Flat cable
Insulation sheet (Big)
Key PWB
Attach the insulation sheet so that the flat cable is insulated from the screw.



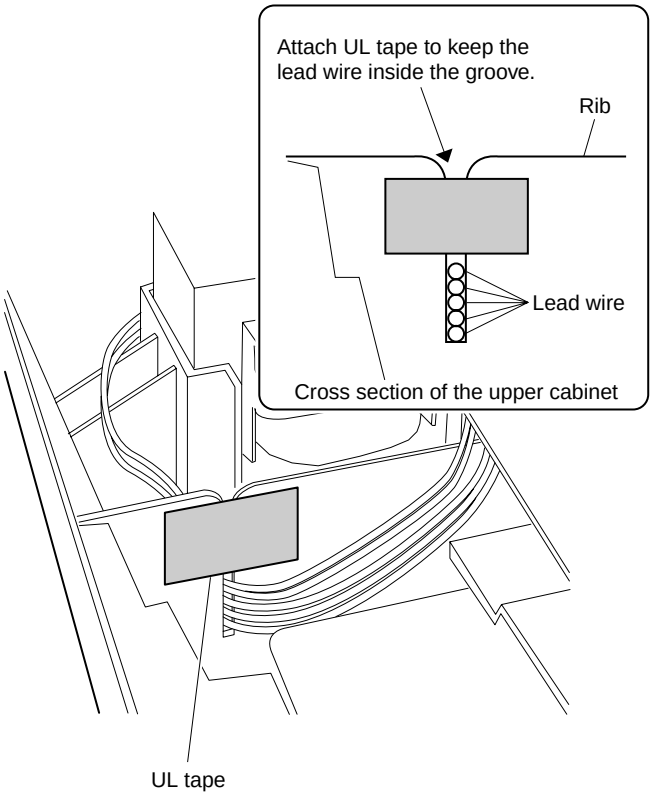
(5) Insulation sheet (Small) attachment

Attach the insulation sheet (Small) to insulate the printer motor wiring.


Insulation sheet (Small)
printer motor wiring
Fold the insulation sheet (Small) to secure the printer motor wiring.
Insulation sheet (Small)
Attach the insulation sheet (Small) to prevent the printer motor wiring from being damaged by the solder section on the back of the printer PWB.

(6) Wiring of the secondary side of the transformer

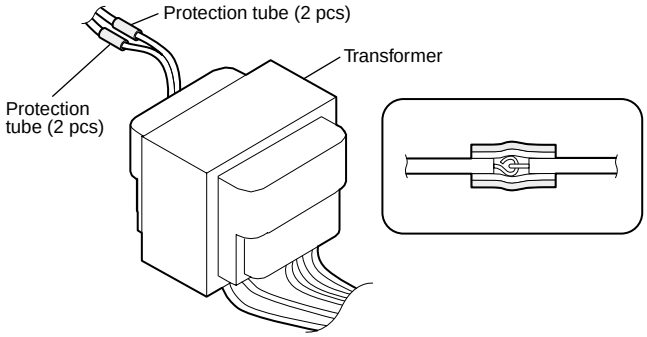
Pass the lead wire of the secondary side of the transformer through the slit section of the rib on the upper cabinet, and attach UL tape to the slit section to fix the lead wire.



(7) Protection tube

(7)-1. CS-4194H (AAC, ACO)

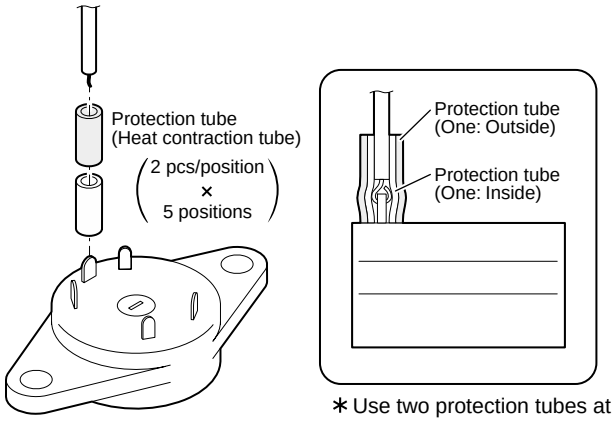
Insulate between the transformer and the AC cord connector with protection tubes (2 pcs × 2 positions).



(7)-2. CS-4194H (TRC)

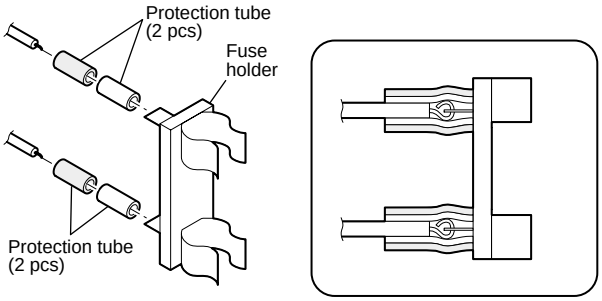
The CS-4194H (TRC) uses 14 protection tubes in total (that is, 2 pcs × 7 positions) as shown above.

[VOLTAGE SELECTOR]


Protection tube (Heat contraction tube)
2 pcs/position × 5 positions
Protection tube (One: Outside)
Protection tube (One: Inside)

∗ Use two protection tubes at every one position.

[FUSE HOLDER]

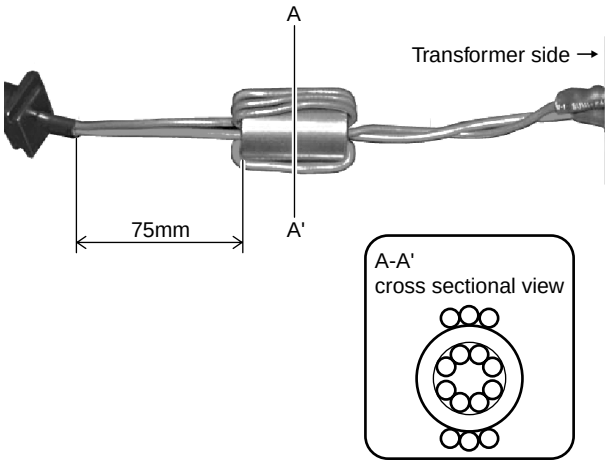


(8) Ferrite core (CS-4194H (AAC, ACO))

(8)-1.

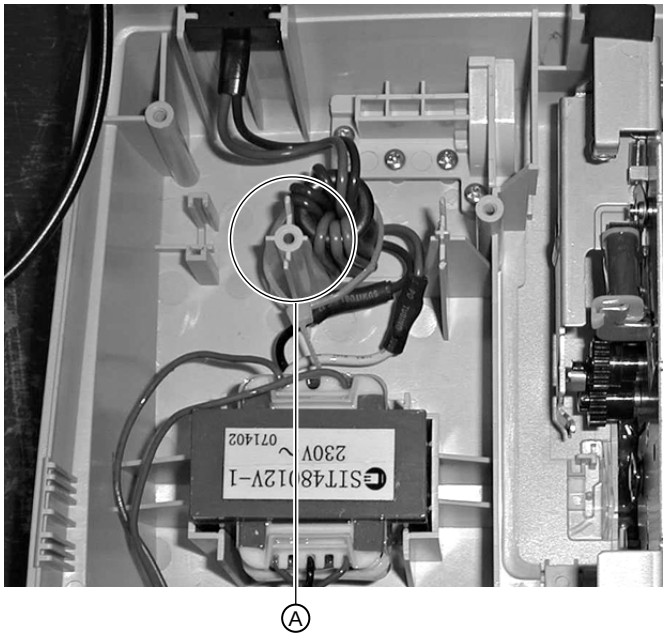
Wind the AC cord around the ferrite core so that the size is as shown in the figure below.

Wind every AC cord three times around the ferrite core.

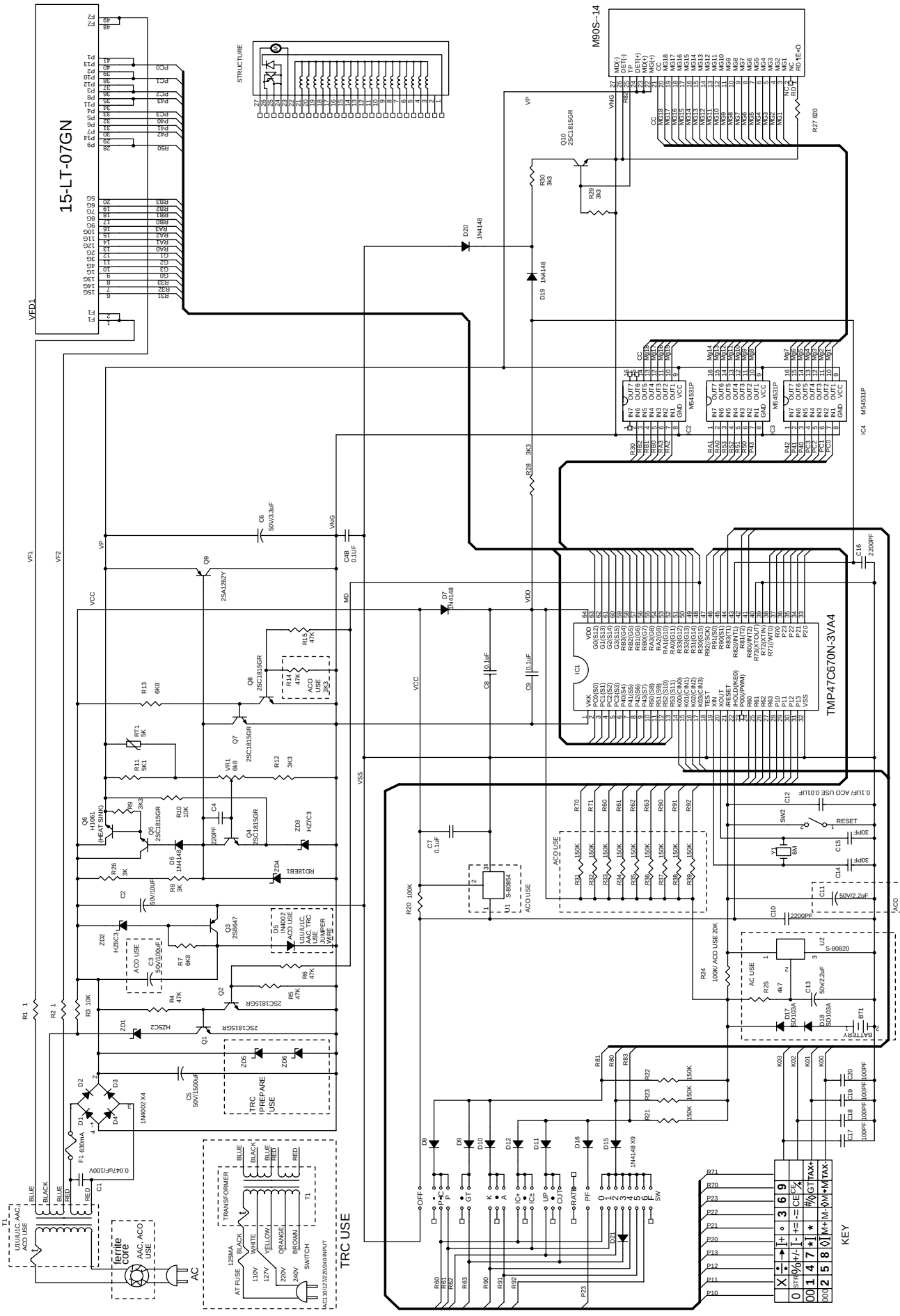


(8)-2. Fix the ferrite core to the cabinet

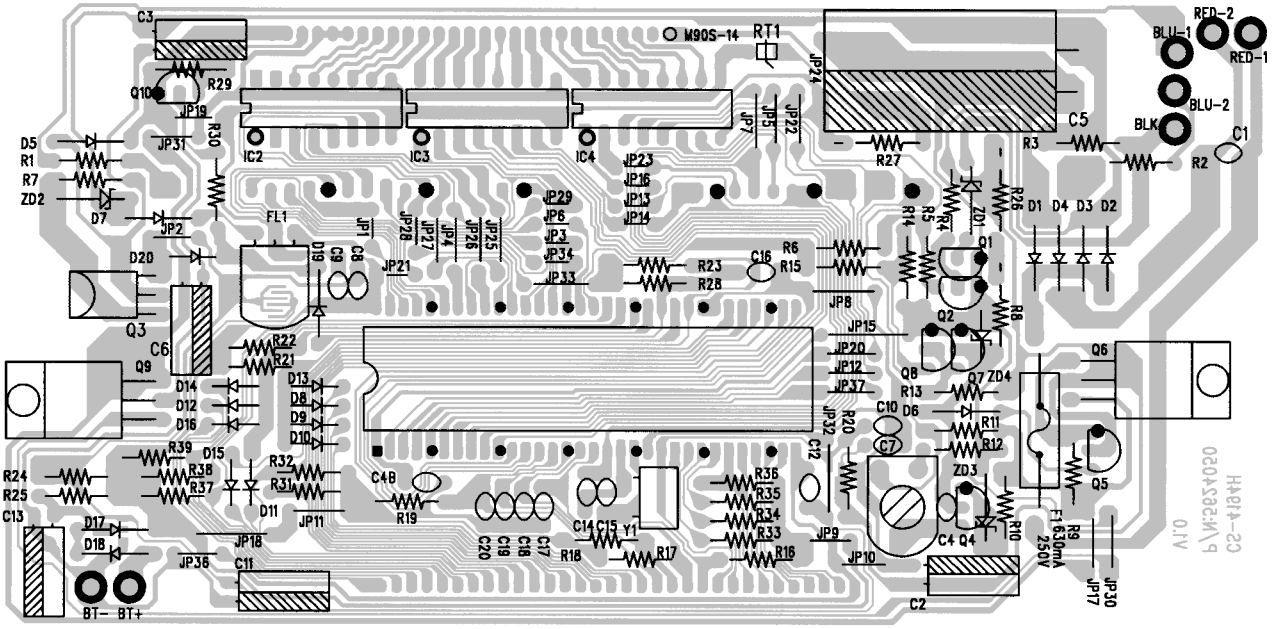
Fix the ferrite core to the root of boss Ⓐ by hot melt as shown in the figure below.



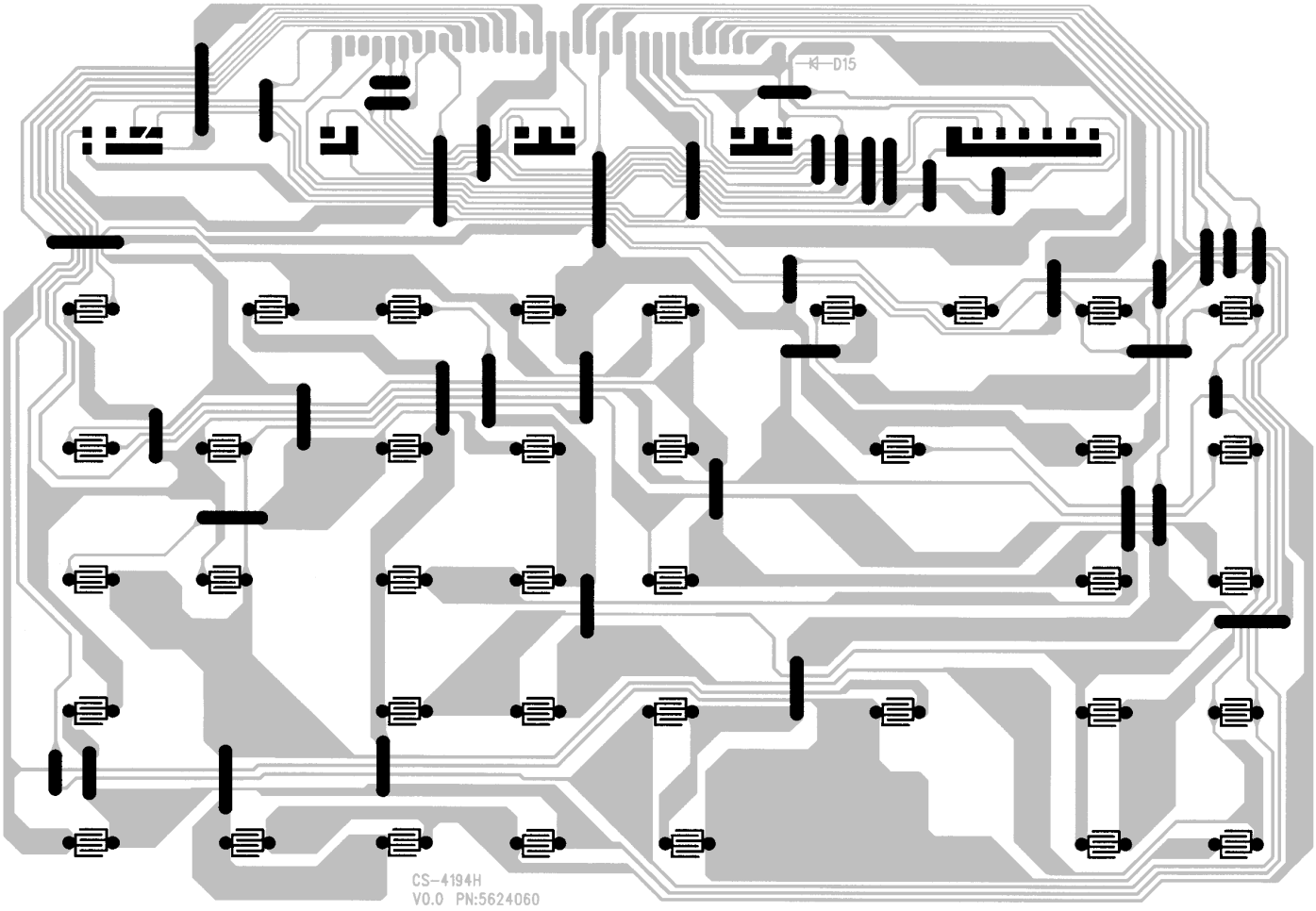
9. Circuit diagram



10. Main PWB parts position



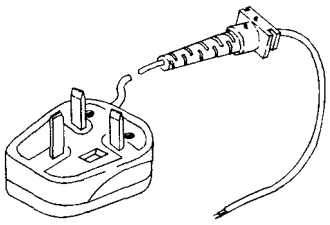
11. Key PWB pattern



Plug shape

0GS5420480////

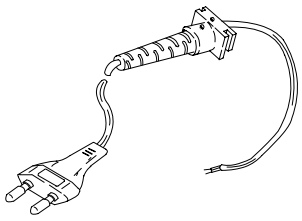
1



(AAC)

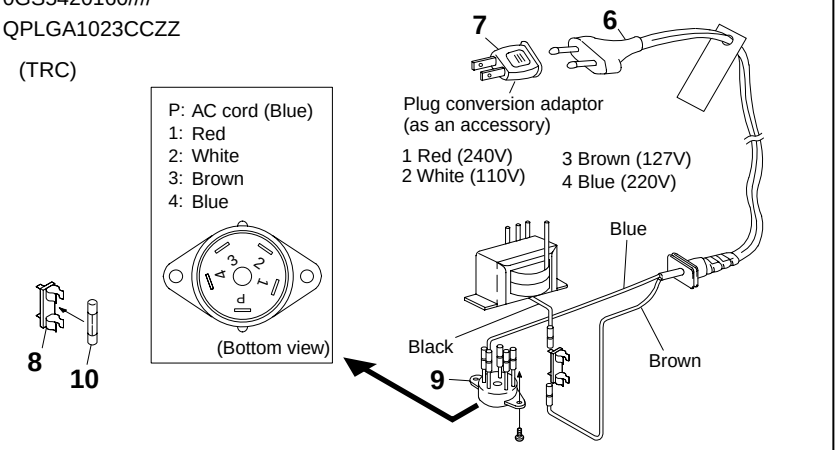
0GS5420450////

3



(ACO)

0GS5420160////
QPLGA1023CCZZ
(TRC)



List of destinations (Destinations are determined by the name plate voltage and the plug shape.)

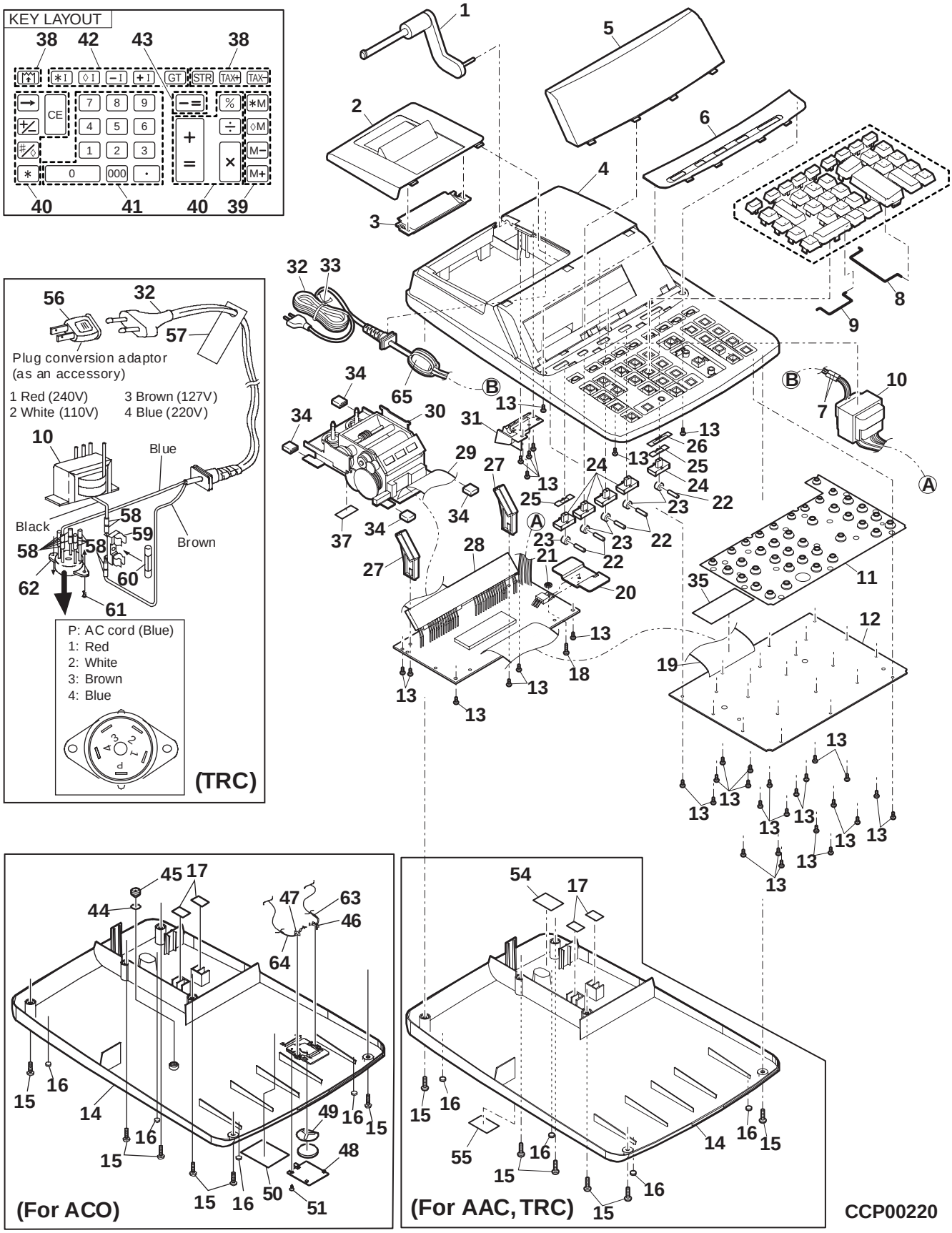
Destination	To identify destination		Major shipping country	Remarks
	Name plate voltage (V)	Plug shape No.		
AAC	220-230	1	U.K.	
ACO	220-230	3	European countries	
TRC	Multi (110/127/220/240)	6 and 7	SRH, Other countries	

AC cord

NO.	PARTS CODE	PRICE RANK	Type of Lead		DESCRIPTION	MODEL NAME
			2 LEAD	3 LEAD		CS-4194H
1	0GS5420480////	AY	O		AC cord AAC	O
2						
3	0GS5420450////	AR	O		AC cord ACO	O
4						
5						
6	0GS5420160////	AP	O		AC cord TRC	O
7	QPLGA1023CCZZ	AG	—	—	Plug change adaptor TRC	O
8	0GS6174280////	AD	—	—	Fuse holder TRC	O
9	0GS5253340////	AN	—	—	Voltage selector TRC	O
10	0GS3610270////	AD	—	—	Fuse (T125mA) TRC	O

■ PARTS GUIDE

1 Exteriors



1 Exteriors

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	0GS650063 0 ／／／／	AP		C	Paper holder unit(GRAY 8)
2	0GS615256 0 ／／／／	AP		D	Printer cover(GRAY 8)
3	0GS615063 0 ／／／／	AD		C	Paper cutter
4	0GS611020 0 ／／／／	AY		D	Upper case(GRAY 8)
5	0GS614005 0 ／／／／	AQ		D	Display panel
6	0GS615257 0 ／／／／	AL		C	SL-SW panel(GRAY 8)
7	PTUBU1004CCZZ	AA		C	Protection tube(M4) (AAC,ACO)
8	0GS634601 0 ／／／／	AD		C	Key finger(LARGE/for +=KEY)
9	0GS634602 0 ／／／／	AC		C	Key finger(for 0KEY)
⚠ 10	0GS312034 0 ／／／／	AW	N	B	Transformer(230V) (AAC,ACO)
⚠ 10	0GS312038 0 ／／／／	AX	N	B	Transformer(MULTI) (TRC)
11	0GS553422 0 ／／／／	AP		C	Key rubber
12	0GS562406 0 ／／／／	AV		E	PWB(KEY BOARD)
13	XUBSD26P06000	AA		C	Screw(2.6×6) [for Other parts]
14	0GS612023 0 ／／／／	AY		D	Lower case(GRAY 8) (AAC)
14	0GS612033 0 ／／／／	AY	N	C	Lower case(for ACO) (ACO)
14	0GS611836 0 ／／／／	AY	N	D	Lower case(with hole) (TRC)
15	XUPSN30P08000	AA		C	Screw(3×8) [for LOWER CASE]
16	0GS632229 0 ／／／／	AD		D	Rubber foot [for LOWER CASE]
17	0GS631672 1 ／／／／	AB		C	Cushion(for Transformer)
18	XBPSN30P08000	AA		C	Screw(3×8) [for HEAT SINK]
19	0GS511073 0 ／／／／	AF		C	Flat cable(K/B+M/B)
20	0GS625128 0 ／／／／	AF		C	Heat sink
21	XNESD30－24000	AA		C	Nut(M3) [for HEAT SINK]
22	0GS634446 0 ／／／／	AC		C	SL-SW shaft
23	0GS617377 0 ／／／／	AC		C	SL-SW roller
24	0GS615290 0 ／／／／	AC		C	SL-SW knob(GRAY 8)
25	0GS631026 0 ／／／／	AC		C	SL-SW mask-S(GRAY 8)
26	0GS631025 0 ／／／／	AC		C	SL-SW mask-L(GRAY 8)
27	0GS615231 0 ／／／／	AH		C	DG holder
28	0GS451093 0 ／／／／	BD		B	Display tube(15LT07GN) [VFD1]
29	0GS511074 0 ／／／／	AE		C	Flat cable(PRINTER)
30	0GS570023 0 ／／／／	BR		E	Printer head(M90S14)
31	0GS615260 0 ／／／／	AH		C	Paper holder supporter(GRAY 8)
⚠ 32	0GS542048 0 ／／／／	AY	N	B	AC cord (AAC)
⚠ 32	0GS542045 0 ／／／／	AR		B	AC cord (ACO)
⚠ 32	0GS542016 0 ／／／／	AP		B	AC cord (TRC)
33	UBNDA1008CCZZ	AA		C	Cord band
34	0GS553426 0 ／／／／	AB		D	Rubber foot [for PRINTER]
35	0GS631447 0 ／／／／	AE		C	Insulation sheet(45×40×0.1)(BIG)
37	0GS631741 0 ／／／／	AD		C	Insulation sheet(SMALL)
38	0GS615296 0R／／／	AL		C	Key unit-4(GRAY 6.5)(↑,STR,TAX+,TAX-)
39	0GS615296 0M／／／	AN		C	Key unit-2(BLUE96)(✱M,◇M,M-,M+)
40	0GS615296 0P／／／	AR		C	Key unit-3(GRAY 6.5)(→,+/-,#/◇,✱,CE +=,%,÷,×)
41	0GS615377 0N／／／	AT	N	C	Key unit-6(1~9,0,000,●)
42	0GS615296 0S／／／	AG		C	Key unit-5(BLUE96)(✱I,◇I,-I,+I,GT)
43	0GS615261 0Q／／／	AE		C	Key(RED 57)(-=)
44	0GS631602 0 ／／／／	AA		C	Reset sheet (ACO)
45	0GS553393 0 ／／／／	AC		C	Reset rubber (ACO)
46	0GS634598 0 ／／／／	AD		C	Battery contact plate ⊕ (ACO)
47	0GS634599 1 ／／／／	AD		C	Battery contact plate ⊖ (ACO)
48	0GS613246 0 ／／／／	AE		D	Battery cover (ACO)
49	0GS631599 0 ／／／／	AE		C	Ring spacer (ACO)
50	0GS943525 0 ／／／／	AA	N	D	Date code label (ACO)
51	0GS689993 3 ／／／／	AB		C	Screw (ACO)[for BATT.COVER]
54	0GS946929 0 ／／／／	AB		D	Fuse label (TRC)
55	TCAUA1210CCZZ	AB		D	V/S caution label(for LOWER CASE) (TRC)
⚠ 56	QPLGA1023CCZZ	AG		B	Plug change adaptor (TRC)
57	TCAUA1213CCZZ	AA		D	V/S caution tag(for AC CORD) (TRC)
58	PTUBU1004CCZZ	AA		C	Protection tube(M4) (TRC)
59	0GS617428 0 ／／／／	AD		C	Fuse holder (TRC)
⚠ 60	0GS361027 0 ／／／／	AD		A	Fuse(T125mA) (TRC)
61	0GS651087 0 ／／／／	AB		C	Screw (TRC)[for V/S]
62	0GS525334 0 ／／／／	AN		B	Voltage selector(ROTARY SWITCH) (TRC)
63	0GS541461 0 ／／／／	AB	N	C	Lead wire(RED)(for Back Up Battery) (ACO)
64	0GS543005 2 ／／／／	AB	N	C	Lead wire(BLACK)(for Back Up Battery) (ACO)
65	0GS311013 0 ／／／／	AL		C	Ferrite core (AAC,ACO)

2 Packing material & Accessories

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	0GS9201830／／／／	AK	N	D	Manual(E/F/S) (AAC,TRC)
	0GS9201840／／／／	AP	N	D	Manual(E/G/F/I/S/SW/N/P/FI) (ACO)
2	0GS9301970／／／／	AQ	N	D	Gift box (AAC,TRC)
	0GS9302080／／／／	AQ	N	D	Gift box (ACO)
3	0GS9429240／／／／	AH		D	Pulp mold(L)
4	0GS9429250／／／／	AH		D	Pulp mold(R)
5	SSAKA3441QCZZ	AB		D	Vinyl bag(320×470mm) [for UNIT]
6	SSAKA5004CCZZ	AA		D	Vinyl bag [for AC CORD]
7	0GS9183920／／／／	AC	N	D	Caution card (ACO)
8	0GS9413820／／／／	AA	N	D	P.E.bag (ACO)[for BATTERY]

3 PWB unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	0GS4313750／／／／	AZ		B	LSI(TMP47C670N-3VA4) [IC1]
2	VHiM54531P+−1	AG		B	Driver IC(M54531P) [IC2-IC4]
⚠ 3	0GS3610262／／／／	AF		A	Fuse(T630mAT) [F1]
4	VHD10E1N／／／−1	AB		B	Diode(1N4002) [D1-D4]
5	VHDDSS131／／−1	AA		B	Diode(1N4148) [D6-D12,D15-D16,D19-D21]
6	VCQYNU2AM473M	AB		C	Capacitor(100WV 0.047μF) [C1]
7	VCEAGU1HW106M	AB		C	Capacitor(50WV 10μF) [C2]
8	0GS2215868／／／／	AL		C	ELE.Capacitor(1500μF/50V) [C5]
9	VCEAGU1HW335M	AA		C	Capacitor(50WV 3.3μF) [C6]
10	VCEAGU1HW225M	AA		C	Capacitor(50WV 2.2μF) (AAC,TRC)[C11]
	VCEAGU1HW225M	AA		C	Capacitor(50WV 2.2μF) (ACO)[C13]
11	0GS2510467／／／／	AE		C	Capacitor(0.1μF/50V) (AAC,TRC)[C4B,C7-C9,C12]
12	VCKYPU1HB222K	AA		C	Capacitor(50WV 2200pF) [C10,C16]
13	VCKYPU1HB101K	AA		C	Capacitor(50WV 100PF) [C17-C20]
14	VCCCPU1HH300J	AA		C	Capacitor(50WV 30PF) [C14,C15]
15	VCKYPU1HB221K	AB		C	Capacitor(50WV 220pF) [C4]
16	VRD−HT2EY1R0J	AA		C	Resistor(1/4W 1Ω ±5%) [R1,R2]
17	VRD−HT2EY154J	AA		C	Resistor(1/4W 150KΩ ±5%) [R21-R23]
18	VRD−HT2EY682J	AA		C	Resistor(1/4W 6.8KΩ ±5%) [R7,R13]
19	VRD−HT2EY103J	AA		C	Resistor(1/4W 10KΩ ±5%) [R3,R10]
20	VRD−HT2HY473J	AA		C	Resistor(1/2W 47KΩ ±5%) (AAC,TRC)[R4-R6,R14-R15]
21	VRD−HT2EY104J	AA		C	Resistor(1/4W 100KΩ ±5%) (AAC,TRC)[R20,R24]
22	VRD−HT2EY302J	AA		C	Resistor(1/4W 3.0KΩ ±5%) [R8,R26]
23	VRD−HT2EY332J	AA		C	Resistor(1/4W 3.3KΩ ±5%) [R9,R12,R28-R30]
24	VRD−HT2EY512J	AA		C	Resistor(1/4W 5.1KΩ ±5%) [R11]
25	VRD−HT2HY821J	AA		C	Resistor(1/2W 820Ω ±5%) [R27]
26	RVR−MF310QCZZ	AC		B	Variable resistor(6.8KΩ) [VR1]
27	VHH5KD5／／／−1	AB		B	Thermistor(5KD5) [RT1]
28	VHEHZ6C3／／／−1	AB		B	Zener diode(HZ6C3) [ZD2]
29	0GS4150111H／／／／	AC		B	Zener diode(HZ5C2) [ZD1]
30	0GS4150241／／／／	AC		B	Zener diode(RD18EB1) [ZD4]
31	0GS4151223／／／／	AC		B	Zener diode(HZ7C3) [ZD3]
32	0GS4110334／／／／	AF		B	Transistor(2SB647C) [Q3]
33	VS2SC1815−GRC	AB		B	Transistor(2SC1815GR) [Q1,Q2,Q4,Q5,Q7]
	VS2SC1815−GRC	AB		B	Transistor(2SC1815GR) [Q8,Q10]
34	0GS4120992／／／／	AL		B	Transistor(H1061C) [Q6]
35	VS2SA1262−Y−1	AE		B	Transistor(2SA1262-Y) [Q9]
36	0GS3430650／／／／	AK		B	Ceramic resonator(6MHz) [Y1]
37	0GS4140640／／／／	AC		B	Diode(SD103A) (TRC)[D17,D18]
38	VCEAGU1HW107M	AC		C	Capacitor(50WV 100μF) (ACO)[C3]
39	VCKYPU1HB103K	AA		C	Capacitor(50WV 0.01μF) (ACO)[C12]
40	0GS2510467／／／／	AE		C	Capacitor(0.1μF/50V) (ACO)[C4B,C7-C9]
41	VHD10E1N／／／−1	AB		B	Diode(1N4002) (ACO)[D5]
42	VRD−HT2EY154J	AA		C	Resistor(1/4W 150KΩ ±5%) (ACO)[R31-R39]
43	VRD−HT2EY203J	AA		C	Resistor(1/4W 20KΩ ±5%) (ACO)[R24]
44	VRD−HT2EY472J	AA		C	Resistor(1/4W 4.7KΩ ±5%) (ACO)[R25]
45	VRD−HT2EY473J	AA		C	Resistor(1/4W 47KΩ ±5%) (ACO)[R4-R6,R15]
46	VRD−HT2EY332J	AA		C	Resistor(1/4W 3.3KΩ ±5%) (ACO)[R14]
47	VRD−HT2EY104J	AA		C	Resistor(1/4W 100KΩ ±5%) (ACO)[R20]
48	0GS4231030／／／／	AL		B	Voltage detector(S80854ANUP) (ACO)[U1]
49	0GS4230671／／／／	AK		B	Voltage detector(S80820ANUP) (ACO)[U2]
50	0GS4151480／／／／	AD		B	Zener diode(HZ18-3) (TRC)[ZD5,ZD6]

SHARP

COPYRIGHT © 2002 BY SHARP CORPORATION

All rights reserved.
Printed in Japan.
No part of this publication may be reproduced,
stored in a retrieval system, or transmitted.
In any form or by any means,
electronic, mechanical, photocopying, recording, or otherwise,
without prior written permission of the publisher.

SHARP CORPORATION
Communication Systems Group
Quality & Reliability Control Center
2002 November Printed in Japan ⓣ